

Virginia Conservation Lands Needs Assessment

Increasing human population has been a driving force in the rapid development of Virginia in recent decades. Of all the development that has occurred in the last 400 years, more than a quarter of it has taken place in the last 15 years. If Virginia continues to grow as it has, more land will be developed in the next 40 years than have been since the Jamestown settlement was established in 1607. The population of Virginia is predicted to increase 5% by the year 2010, by almost 15% by the year 2020, and by nearly 24% by the year 2030. The pressures of development will increase as the population continues to increase, thus land conservation must become a prominent consideration in all land planning efforts at the local, regional, and commonwealth levels if we are to effectively conserve lands for future generations. These lands provide benefits in terms of open space, recreation, cultural and historic resource protection, natural resource protection, water quality improvement and maintenance, and carbon sequestration, along with the economic benefits associated with these functions. The Virginia Conservation Lands Needs Assessment (VCLNA) can help guide effective conservation by providing tools that help both government and private organizations identify resource protection areas and that, at the local level, help planners manage growth in a balanced way.

Balanced land use and land conservation were major themes in Governor Timothy Kaine's speech at the 2006 Environment Virginia Conference. Here are some quotes from that speech:

"As we partner to protect Virginia's outdoors, we must put balance at the center of land use decisions. We must create an effective model that encourages redevelopment in cities and suburbs and discourages the wasteful and unnecessary consumption of land farther out from our population centers. And we must reward communities that adopt and use balanced growth policies with economic development assistance and other incentives."

"Balanced land use is about foresight. It's about understanding the needs of today and weighing them against the needs of tomorrow. It's about solutions that meet both the short-term needs of business and the long-term needs of a community. It's about considering all the ramifications of growth, from the logistical burden it places on public resources to the quality-of-life burden it places on people in terms of energy usage, commute times and community quality. It's about rejecting the false choice of growth or no-growth and replacing it with growth that is sustainable."

"Since 1968, Virginia has preserved 330,000 acres of land. Most of that has been preserved in the past five years. The goal of my administration is for the state to preserve an additional 400,000 acres by the end of the decade. To accomplish that, we rely heavily upon the open-space protection tools that have served Virginia well: Our land preservation tax credit and the Virginia Land Conservation Foundation."

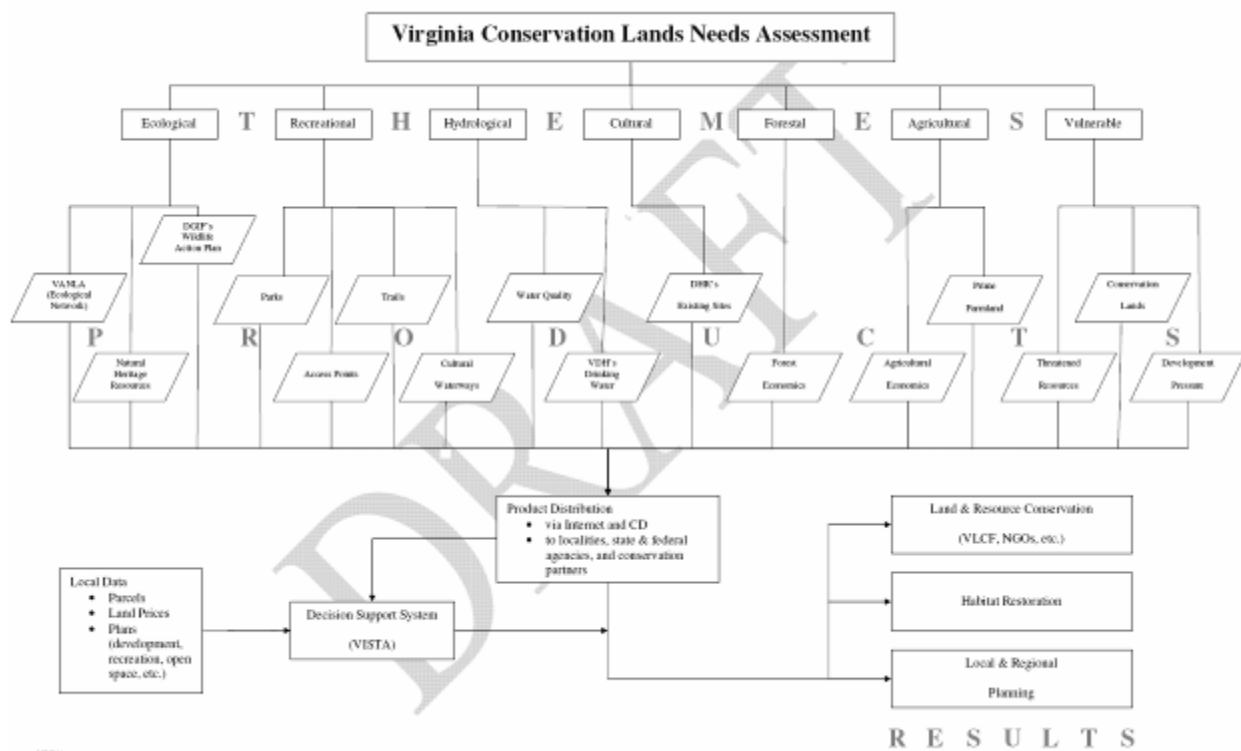
The VCLNA will be used by DCR to prioritize conservation targets for the Virginia Land Conservation Foundation.

What is the Virginia Conservation Lands Needs Assessment (VCLNA)?

The VCLNA is a flexible, widely applicable tool for integrating and coordinating the needs and strategies of different conservation interests, using GIS (Geographic Information System) to model and map land conservation priorities and actions in Virginia. The VCLNA allows the manipulation of issue-specific data sets that can be weighted and overlaid to reflect the needs and concerns of a variety of conservation partners - issues like:

- unfragmented natural habitats
- natural heritage resources
- outdoor recreation
- prime agricultural lands
- cultural and historic resources
- sustainable forestry
- water quality improvement
- drinking water protection

Overview of the Virginia Conservation Lands Needs Assessment



[Click on the diagram to see a fullscreen image.](#)

Green Infrastructure / VCLNA GIS Models

In an effort to make the VCLNA a comprehensive green infrastructure planning tool additional geospatial datasets are being created for the varied needs of additional conservation partners. The Chesapeake Bay Program has identified some available datasets and created useful models as part of their Resource Lands Assessment. DCR has built on the [GIS models](#) used for the [Chesapeake Bay Program's Resource Lands Assessment](#), modifying methodology, adjusting weights, and adding data to tailor them specifically for Virginia interests. The Virginia Coastal Program and the Virginia Land Conservation Foundation are funding the VCLNA. Depending on needs identified, other datasets might include or address:

- Spatially explicit sites identified as priorities through existing plans (such as Partners in Flight priority sites).
- Local parks, local natural features (useful for Green Infrastructure identification)
- Wildlife diversity (for State Wildlife Comprehensive Planning)
- Recreational lands and identified recreation needs (for Virginia Outdoors Plan)
- Forest use and forest economic data (for Sustainable Forestry decision-making)
- Surface and subterranean drinking water sources (for drinking water protection)
- Biotic and abiotic factors that influence stream water quality (for water quality protection and improvement)
- Historic and cultural resource locations (for historic resource protection)
- Prime agricultural lands (for Agricultural Reserves)
- Growth measures (for vulnerability analyses)

DCR-DNH has made strides in recent years in the development of the main ecological component of the VCLNA with the completion of the Coastal Zone Natural Landscape Assessment (VaNLA). Although the VaNLA provides a good starting point identifying “green infrastructure”, there are additional components to consider for a more comprehensive Green Infrastructure GIS model in Virginia. DCR-DNH is expanding the VCLNA to include data for cultural and historic resources, population growth / vulnerability, sustainable forestry / forest economics, prime agricultural soils, outdoor recreation, drinking water protection and water quality.

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There should be additional grant numbers. We should also add VLCF funding and all the logos (VLCF, VOF, CBP, etc.)



Virginia Coastal Zone
MANAGEMENT PROGRAM



Green Infrastructure

The VCLNA models are being developed as part of a collaborative effort between the Department of Conservation and Recreation Division of Natural Heritage (DCR – DNH), the Virginia Coastal Zone Management Program (VA-CZM), the Virginia Land Conservation Foundation, and the Virginia Commonwealth University Center for Environmental Studies to map Green Infrastructure in Virginia.

The VCLNA operates as a tool with which to implement green infrastructure planning. Green infrastructure has been defined as “an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America’s communities and people” (<http://www.asu.edu/caed/proceedings00/EUGSTER/eugster.htm>).

Green infrastructure planning involves the coordination of “conservation values and actions in concert with land development and growth management” ([Benedict, M., Allen, W., and E. McMahon. 2004. *Advancing Strategic Conservation in the Commonwealth of Virginia*.](#)

For additional discussions on Green Infrastructure, refer to the following links:

<http://www.greeninfrastructure.net/?article=1001>
<http://www.greeninfrastructure.net/?article=2019>
<http://www.geoplan.ufl.edu/epa/>
<http://www.conservationfund.org/?article=2153>
<http://www.dnr.state.md.us/greenways/gi/gi.html>

Green Infrastructure Advisory Workgroup

The Green Infrastructure Advisory Workgroup (GIAW) was developed to guide the development of a comprehensive green infrastructure for Virginia. Specifically, the workgroup met to discuss and identify:

- Issues related to Green Infrastructure that the workgroup feels should be addressed.
- Datasets, existing or in need of development, pertinent to Green Infrastructure and coastal resource management.
- Product deliverables, including data and analytical tools needed to assist user’s in managing coastal resources.
- Continued collaboration on conservation and green infrastructure initiatives.

The Green Infrastructure Advisory Workgroup (GIAW) was formed as part of the Department of Conservation and Recreation Division of Natural Heritage’s FY 04 Task 93.06 Green GIS Grant with the DEQ Coastal Management Program. The GIAW was formed to represent Coastal Partner and statewide interests and expertise in the development of the Coastal Zone and statewide Green Infrastructure. The GIAW was composed of a variety of experts selected from Federal, State, Local, Private and Academic sectors. The GIAW functioned as an oversight committee and sub-technical committees were developed for each model developed as part of the VCLNA.

Each meeting including guest speakers presenting on a variety of related topics and updates of the VCLNA modeling process and breakout topic led discussion sessions. Workgroup findings were compiled into a technical report that was submitted to the DEQ Coastal

Management Program. Click here for the [Green Infrastructure Advisory Workgroup Technical Findings Report](#).

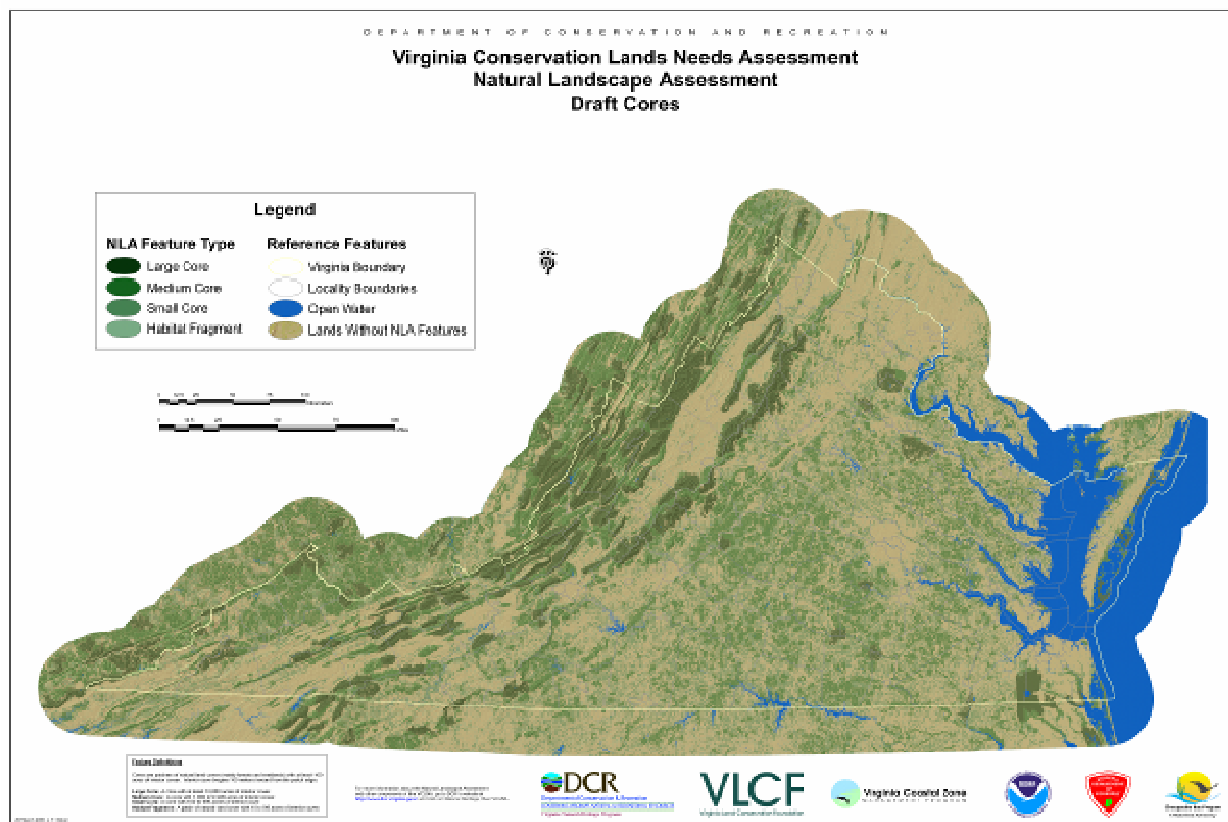
For information on the Green Infrastructure Advisory Workgroup, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Virginia Natural Landscape Assessment

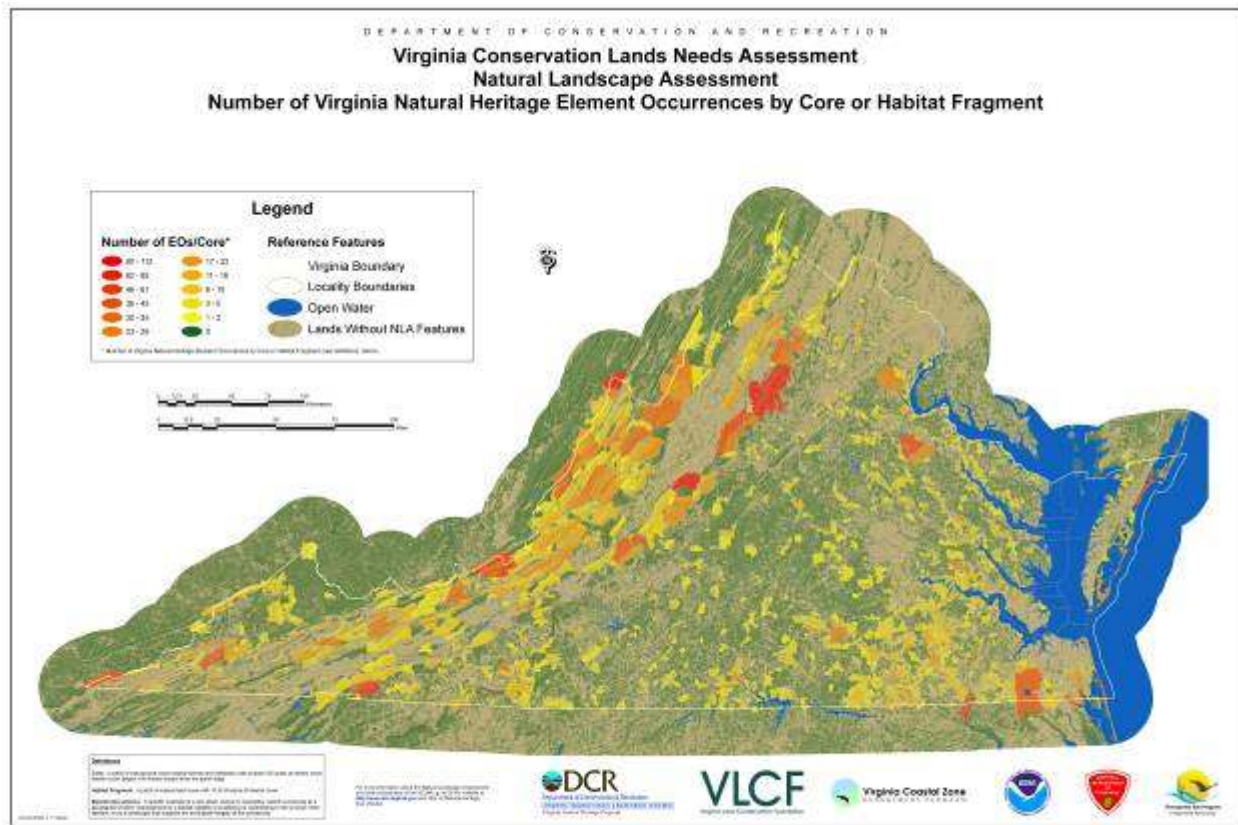
The Virginia Natural Landscape Assessment (VaNLA), an ecological component of the VCLNA, is a landscape-scale GIS analysis for identifying, prioritizing, and linking natural habitats in Virginia. Using land cover data derived from satellite imagery, the VaNLA identifies unfragmented natural habitats called cores, which are large patches of natural land cover (mainly upland forests and forested wetlands, but also included are marshes, beaches, and dunes) with at least 100 acres of interior conditions. Interior conditions begin 100 meters inward from the edges of the cores. Large, medium, and small cores have been identified for the entire Commonwealth (Figure 1), as well as a smaller feature type called "habitat fragments" that have only 10 to 99 acres of interior and may be important in urban localities where few large patches of natural land remain. Cores provide habitat for a wide range of species, from interior-dependent forest species to habitat generalist, as well as species that utilize marsh, dune, and beach habitats. Cores also provide benefits in terms of open space, recreation, water quality (including drinking water protection), and carbon sequestration, along with the associated economic benefits of these functions. Cores and habitat fragments are supported and buffered by natural landscape blocks, which are aggregations of cores, habitat fragments, and adjacent natural lands. Natural landscape blocks can be used as coarse analysis units for broad geographic areas.

Cores, habitat fragments, and natural landscape blocks have been mapped for the entire study area. Dozens of prioritization attributes have been assigned to the cores and habitat fragments. An example of one prioritization attribute, the number of natural heritage elements (i.e. rare species or ecological communities) per core or habitat fragment, can be viewed in Figure 2. The cores layer was built with many separate prioritization attributes to allow end users to quickly view attributes of interest and to facilitate incorporation of separate attributes into decision support systems. Modeling is underway now to synthesize ecological significance from a subset of the prioritization attributes. This synthesis will result in a new prioritization attribute that will be used to rank cores and habitat fragments by ecological significance. The highest-ranked cores will be connected by corridors of natural land cover to create a core and corridor network for the Commonwealth.

VaNLA products will be used by VLCF, state and federal agencies, and other conservation partners for land and resource conservation and habitat restoration. The data also will be distributed to localities to be used in local and regional planning efforts.



Click on the map to see a fullscreen image.



Click on the map to see a fullscreen image.

The Coastal Zone Natural Landscape Assessment

The Virginia Department of Conservation and Recreation (DCR), with funding assistance from the [Virginia Coastal Program](#) of the Department of Environmental Quality, the Department of Forestry, and the [Virginia Land Conservation Foundation](#), has completed a pilot Virginia Natural Landscape Assessment for Virginia's Coastal Resources Management Area, those counties and cities that touch on tidal waters. DCR built on the GIS ecological model used for the [Chesapeake Bay Program's Resource Lands Assessment Ecological Assessment](#), modifying methodology, adjusting weights, and adding data to tailor them specifically for Virginia interests. Of particular significance is the use of land cover data based on year 2000 satellite imagery instead of the 1992 imagery used in the CBP product. Results of this pilot can be viewed below (Figure 3).

addition of the habitat fragment feature type that is important in the more developed localities that have few or no cores. Another improvement is in the use of statewide land cover data that were all processed by the same research group.

Coastal Zone NLA Atlas

Atlasses were produced for the pilot analysis - one comprehensive Atlas for the entire Coastal Zone and 8 regional Atlases for each of the coastal Planning Districts. The contents of these Atlases are available [online](#) and on [CD by request](#) and include:

- Maps showing:
 - prioritized cores and corridors
 - protected lands that intersect cores
 - the most vulnerable cores
 - Natural heritage conservation sites and cores that intersect them
- A catalog of cores identifying the specific values that determine their priority
- Data CD containing GIS models and all coastal zone NLA data

VaNLA Atlas

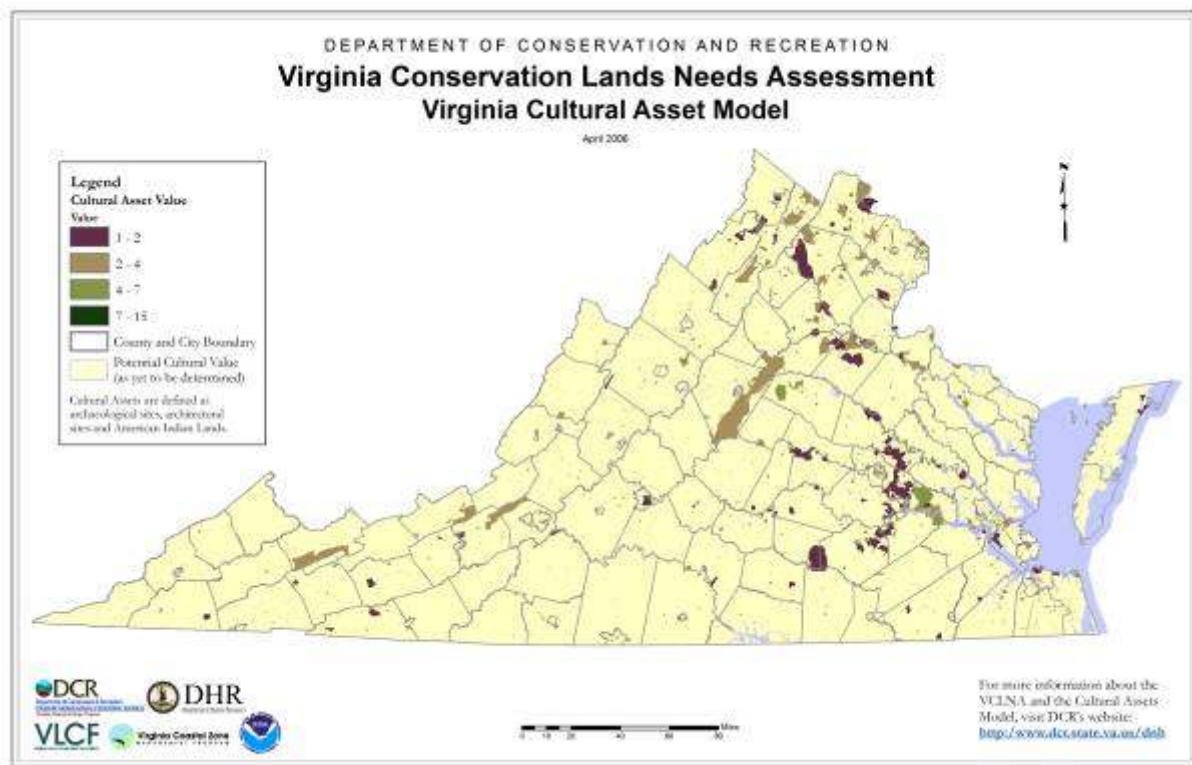
A comprehensive digital atlas will be produced with maps for all the Planning Districts in the Commonwealth. The contents of these atlases will be similar to those resulting from the CZNLA. Additional mapping resources are anticipated that will allow users to browse VaNLA data and make their own maps.

Application of the VaNLA

Some general categories of uses to which the VaNLA data can be applied include:

- Targeting – to identify targets for protection activities such as conservation land purchase or easements.
 - Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
 - Local planning – guidance for comprehensive planning and local ordinance and zoning development.
 - Assessment – to review proposed projects for potential impacts to cores and other VaNLA features.
 - Land management – to guide property owners and public and private land managers in making land management decisions that enhance ecological values.
 - Public education – to inform the citizenry about the patterns and extent of habitat fragmentation.
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Cultural Model



The objective of the Cultural Model is to map the relative cultural value of lands in Virginia. DCR – DNH collaborated with the Virginia Department of Historic Resources (<http://www.dhr.virginia.gov/>) in the development of this model in an effort to help promote the mission of DHR “to foster, encourage, and support the stewardship of Virginia's significant historic, architectural, archaeological, and cultural resources”. DHR was used as the expert source for model parameter weighting and as the data sources.

The cultural data model includes the following datasets with the associated attributes that controlled the ranking of:

- Archaeological and Architecture sites
 - Entity has been listed as a National Historic Landmark
 - Entity listed in the Virginia Landmarks Registry
 - Entity has been listed in the National Register of Historic Places
 - Historic preservation easement
 - Sites that are eligible to be on the national register
 - Sites for which a national register eligibility determination has not been made
 - Sites that are not eligible to be on the national register
- American Indian Lands

Application of the Cultural Model

Some general categories of uses to which the cultural model data can be applied include:

- Targeting – to identify targets for protection activities.

- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review proposed projects for potential impacts to archaeological sites, architectural sites or American Indian Lands.
- Land management – to guide property owners and public and private land managers in making land management decisions that enhance cultural values.
- Public education – to inform the citizenry about the cultural value of their community, helping retain the unique sense of place associated with these communities.

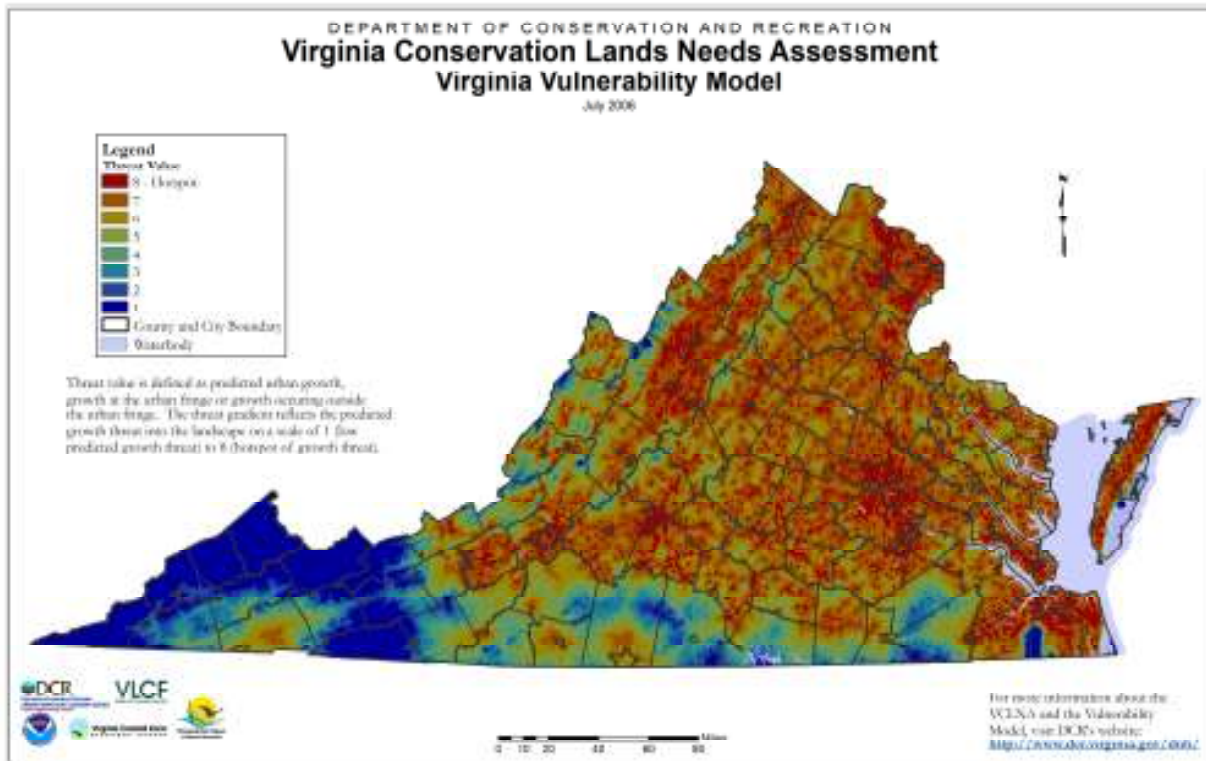
Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Cultural value of land
 - Vulnerable cultural lands
 - A report detailing the methodology
- Metadata
- Personal geodatabase and shapefiles with cultural and cultural_pks feature classes attributed for the absence or presence of an archaeological, architectural, American Indian Land and / or park land, the associated total weight for that particular entity and the cultural total weight which is the sum of all weights of all entities present in the specific geographic location.
- For specific archaeological or architectural datasets, please contact the Department of Historic Resources
http://www.dhr.virginia.gov/homepage_features/map_to_richmond.htm).

For more information on the Virginia Cultural Model, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Vulnerability Model



The Virginia Vulnerability Model was developed in an effort to map predicted growth in Virginia. The growth prediction may be used as an indication of potential land use change from the current use to an urban or suburban use.

In an effort to map the predicted growth in Virginia, four models were developed:

- Virginia Urban Vulnerability Model which shows predicted urban growth
- Virginia Urban Fringe Vulnerability Model which shows the predicted urban fringe, or metropolitan fringe growth.
- Virginia Vulnerability beyond the Urban Fringe Model which show the predicted growth beyond the urban fringe (ex-urban growth).
- Virginia Vulnerability Model which shows a composite of all the vulnerability models integrated into one model representing growth pressures across the urban, suburban and rural landscape.

The Vulnerability models represent predicted growth into the landscape and it is incumbent on the end user to assess what growth represents in terms of sprawl (E. H. Wilson et al. 2003). Urban growth that continues in an unplanned fashion, particularly into previously undeveloped areas, typically has a negative effect on the environment, ecologically, economically and socially (E. H. Wilson et al. 2003, R. E. Heimlich and W. D. Anderson, 2001). As growth and subsequent development continues across the state, remaining resources are being damaged and irretrievably lost.

The development of a GIS vulnerability model puts growth into context in relation to the state; it provides a large scale picture of growth patterns across jurisdictional boundaries. Traditionally state and local government has been reactive to population growth, and while some efforts are being made to control growth, often "strategically directing development to

the most favorable areas well in advance of urban pressures” does not happen (R. E. Heimlich and W. D. Anderson, 2001).

The models, detailed above, represent different growth effects. The only model showing all predicted growth effects is the Virginia Vulnerability Model. The Urban Vulnerability Model shows the predicted urban growth into the landscape, it does not include the suburban or rural growth pressures. The Urban Fringe Vulnerability Model shows the predicted urban fringe, also typically called suburban, growth into the landscape, it does not include urban or rural growth pressures. The Beyond the Urban Fringe Vulnerability Model shows predicted growth outside of the urban fringe, or rural growth pressures, it does not include urban or suburban growth pressures.

The Vulnerability model may serve as a guide to state and local government, consultants, and developers as to the location of growth patterns, particularly in relation to the current environment. The model can be used alone or integrated with other datasets, such as the VCLNA Cultural Model or Ecological Model, to identify which cultural resources or ecological cores are most at risk to these growth pressures. The model may also be used to help guide local land use planners in the development of their comprehensive plans in an effort to control growth and subsequent development within their jurisdiction. It is important to look at the landscape as a whole and assess how growth may impact the environment, what remaining farmland or timberland is available or how water quality will be affected, before more development is introduced.

The models serve as part of a larger green infrastructure plan, which aims to model where Virginia’s conservation priorities are located to facilitate an integrated approach to planning and development. For information on the Virginia Conservation Lands Needs Assessment and the Green Infrastructure Modeling effort, please visit the VCLNA website at <http://www.dcr.virginia.gov/dnh/vclna.htm>.

Application of the Vulnerability Model

Some general categories of uses to which the vulnerability model can be applied include:

- Targeting – to identify targets for protection activities
- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review the state of the land and assess growth in context of the landscape
- Land Management – to guide property owners and public and private land managers in making land management decisions that enhance ecological, social and economic services
- Public Education – to inform the citizenry about the development and growth of their community, helping them stay informed about the state of growth of their area.

The Vulnerability Model serves as a base model, upon which local datasets can be added, such as zoning information, comprehensive plans, parcel data, septic suitability information and any other datasets which may help drive local decision making processes. The constraints of a statewide model include the incorporation of existing, statewide GIS datasets. Incorporation of datasets such as individual locality septic sewer information may not be available statewide and are not included in the model since the effect would skew overall model results. Individuals should use the Vulnerability Models and incorporate any additional datasets as needed to make informed decisions. It is at this local level the end

user may be able to draw his / her own conclusions on growth, sprawl and the impending consequences.

Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Virginia Urban Vulnerability Model
 - Virginia Urban Fringe Vulnerability Model
 - Virginia Vulnerability outside the Urban Fringe Model
 - Virginia Vulnerability Model which shows a composite of all the vulnerability models integrated into one model representing growth pressures across the urban, suburban and rural landscape.
- A report detailing the methodology
- Metadata
- Four (4) GRID coverages representing the above detailed models.
- Four (4) shapefiles representing the above detailed models.
- An ArcGIS geodatabase with threat feature classes.

For more information on the Virginia Vulnerability Model(s), please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Forest Economics Model

The objective of the forest economics model is to identify economically important forests in Virginia. DCR – DNH is collaborating with the [Virginia Department of Forestry](http://www.dof.virginia.gov) in the development and implementation of the model. The assessment of forest economic value is important for timberland management as well as forest conservation. Forestry management is important to

- “manage the forest land for a steady supply of timber
 - to ensure the operation and maintenance of the resource
 - to help maintain a stable local economy
- provide recreation opportunities
- maintain aesthetics for Virginians
- maintain wildlife habitats
- create natural reserves
- preserve water quality”

(<http://www.dof.virginia.gov/stforest/index.shtml>)

The forest economics model uses a variety of datasets and subsequent derived datasets from analyses run in GIS. Datasets include:

- Species composition (vegetation community type)
- Soil productivity
- Forest density
- Wetland and riparian features
- Slope
- Threatened and Endangered species / Natural heritage conservation sites
- 2000 census block data
- Historic timber harvest
- Mill locations
- Economic data

Application of the Forest Economic Model

Some general categories of uses to which the forest economic model data can be applied include:

- Targeting – to identify management areas as related to above stated goals.
- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review proposed projects for potential impacts.
- Land management – to guide property owners and public and private land managers in making land management decisions as related to timberland and forest management activities / plans.
- Public education – to inform the citizenry about the importance of Virginia’s forests.

Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Virginia Forest Economics Model
 - Forest Economic Model overlaid with the Virginia Vulnerability Model
- A report detailing the methodology
- Metadata
- An ArcGIS geodatabase, shapefiles, and/or ArcINFO Grids forest economic data.

For more information on the Virginia Forest Economics Model, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Recreation Model

The objective of the recreation model is map the recreational value of land in Virginia based on specific model parameters. This model is specific to Virginia and has been added to the VCLNA effort. DCR-DNH is teaming the DCR Division of Planning and Recreation Resources and the Virginia Department of Game and Inland Fisheries in this effort.

The recreation model uses a variety of datasets and subsequent derived datasets from analyses run in GIS. Datasets include:

- Access points
- Trails
 - Blueways
 - Greenways
 - Birding Trails
- Parks
 - Federal
 - State
 - Local
- Department of Game and Inland Fisheries Hunting and Fishing Data

Application of the Recreation Model

Some general categories of uses to which the recreation model data can be applied include:

- Targeting – to identify areas of high recreational value.
- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review proposed projects for potential impacts.
- Land management – to guide property owners and public and private land managers in making land management decisions, particularly highlighting the relationship between land value and open space / recreation areas.
- Public education – to inform the citizenry about the importance of Virginia’s recreational lands.

Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Virginia Recreation Model
 - Recreation Model overlaid with the Virginia Vulnerability Model
- A report detailing the methodology
- Metadata
- An ArcGIS geodatabase, shapefiles, and/or ArcINFO Grids forest economic data.

For more information on the Virginia Recreation Model, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Agricultural Model

The objective of the agricultural model is to identify areas considered to be prime farmland in Virginia. The model will determine areas of importance for agricultural productivity.

The agricultural model uses a variety of datasets and subsequent derived datasets from analyses run in GIS. Datasets include:

- STATSGO and SSURGO soils data (including prime, unique or locally important farmland)
- Land use
- Drainage
- Erosion
- Slope
- RESAC 2000 land cover

Application of the Agricultural Model

Some general categories of uses to which the agricultural model data can be applied include:

- Targeting – to identify areas of high agricultural value.
- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review proposed projects for potential impacts.
- Land management – to guide property owners and public and private land managers in making land management decisions, particularly highlighting the relationship between sprawl and conversion of agricultural land to subdivisions.
- Public education – to inform the citizenry about the importance of Virginia's farmland.

Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Agricultural value of farmland in Virginia.
 - Agricultural model in relation to vulnerability model, recreational model, water quality model, cultural model, forest economic model and ecological model.
 - Natural heritage conservation sites and cores that intersect prime farmland.
- A report detailing the methodology
- Metadata
- An ArcGIS geodatabase, shapefiles, and/or ArcINFO Grids.

For more information about the Virginia Agricultural Model, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

Water Quality Model

The objective of the water quality model is to predict the relative value of lands for protecting water quality and watershed integrity (Chesapeake Bay RLA). This model will be done in conjunction with the [Department of Conservation Division of Soil and Water Conservation Program](#) and other partners to be determined. The Division of Soil and Water work on a variety of GIS models that incorporate values important to water quality and watershed function.

The water quality model uses a variety of datasets and subsequent derived datasets from analyses run in GIS. Datasets include:

- Erodible soils
- Net Primary Productivity
- Slope
- Wetland Function
- Forest Fragmentation
- Stream Density
- Land Use
- Concentrated animal feeding operations
- Impervious surfaces
- Drinking water sites and wellhead areas

Application of the Water Quality Model

Some general categories of uses to which the water quality model data can be applied include:

- Targeting – to identify areas important for maintaining or improving water quality.
- Prioritizing – to provide primary or additional justification for key conservation land purchases and other protection activities.
- Local planning – guidance for comprehensive planning and local ordinance and zoning development.
- Assessment – to review proposed projects for potential impacts.
- Land management – to guide property owners and public and private land managers in making land management decisions.
- Public education – to inform the citizenry about the importance of land use and the effect on water quality and watershed integrity.

Products

Maps will be produced for the entire Coastal Zone and the Planning District Commissions and included as part of the final report. The report will be available online and on CD by request and include:

- Maps showing:
 - Water Quality Model
- A report detailing the methodology
- Metadata
- An ArcGIS geodatabase, shapefiles, and/or ArcINFO Grids forest economic data.
 - Natural heritage conservation sites and cores that intersect lands important to water quality.

For more information about the Virginia Water Quality Model, please contact Jennifer Ciminelli at jennifer.ciminelli@dcr.virginia.gov or 804-786-3375.

How can the VCLNA be used?

The VCLNA can be utilized as a decision support tool for local and regional agencies and organizations in their efforts to employ [green infrastructure principles](#) during their planning processes.

We encourage people to review these products, to try to use them to accomplish conservation goals, and to consider ways in which they could be improved to accomplish current projects more effectively or to enable their use in future projects.

We encourage local and regional agencies and organizations to implement conservation actions using these data and analyses. As a robust, well-documented GIS model, the Virginia Conservation Lands Needs Assessment can be creatively tweaked to offer practical uses for a variety of needs. The ability to add data makes it an excellent framework for future development of protection and growth planning tools.

There are no legal or regulatory requirements associated with Virginia Conservation Lands Needs Assessment, nor should the VCLNA serve as sole justification for any activities. The VCLNA is a rather coarse-scale analysis that, though informative, needs to be considered in conjunction with any number of other factors in guiding conservation actions or any other activities. DCR is continuing to work on the VCLNA to identify some of these additional decision-guiding factors, but economic, local, and even personal considerations will always be important in decision-making.

The data will be available in GIS format for in-house use, as well as available in hard copy maps for reference. Maps produced from the VCLNA can provide an organizational medium for planners to inform and engage the public at a variety of scales. Be sure to understand what data are and are not presented on each map. Ultimately, we envision serving the VCLNA up on an interactive web site, where individuals will be able to influence the weighting parameters of the model to draw their own conclusions for their plan.